SYMPOSIUM 2 (SP 2)

THE ROLE OF ENVIRONMENTAL CLEANING FOR CURBING HOSPITAL PATHOGENS

SP 2-1

THE ENVIRONMENT AND HEALTHCARE-ACQUIRED INFECTIONS

Stephan Harbarth. *Infection Control Program, Geneva University Hospitals, Geneva, Switzerland*

Contamination of the inanimate healthcare environment with microbial pathogens can lead to contamination of healthcare workers' hands thus providing a vector to infect vulnerable patients. Evidence exists that many of these pathogens survive well in the environment. The conditions, mechanisms and appropriate techniques of environmental decontamination are controversially debated.
Unfortunately, there are many examples of environment-focused studies in hospital hygiene that reveal the missed opportunity of introducing some patient-orientated outcome into the study design. Nevertheless, the role of the environment as a potential reservoir of multidrug-resistant microorganisms (MDROs) and *Clostridium difficile* has recently gained new momentum. Several studies from Europe have highlighted the importance of thorough cleaning practices to avoid transmission of MDROs that are capable of surviving in the environment for extended periods. With respect to hospital cleaning, a broad consensus exists now among European experts that high standards are essential. This message has also been well received in North America, where several descriptive and interventional studies recently addressed the challenge to decrease environmental contamination with MDROs and *C. difficile*.
Cleaning and disinfection are established components of infection control, and special situations may require special procedures, e.g. when treating infected or severely immunocompromised patients or patients harbouring transmissible MDROs. Targeted surface disinfection with a special focus on frequently touched surfaces is indispensable in modern healthcare facilities. However, disinfectants may be hazardous to personnel and patients, as well as the environment, and require special safety precautions. Unrestricted use of biocides, especially in low concentrations, may lead to the development of resistance, and for many surfaces like floors in hospitals thorough cleaning using environmentally friendly detergents is appropriate. New technologies and biocidal substances with promising properties should be further evaluated. As emerging MDROs will challenge healthcare facilities in the coming years even more than at present, there is a need for well designed (multicenter) studies addressing the future role of cleaning and disinfection in healthcare infection control. However, it should be kept in mind that the still too low compliance with hand hygiene is the more urgent problem for the safety of our patients.

SP 2-2

IMPLEMENTATION OF ENVIRONMENTAL CLEANING PROGRAM

Moi Lin Ling. *Singapore General Hospital, Singapore*

Contamination of hospital equipment, medicines, and water supplies with hospital pathogens is a well-recognized cause of common-source outbreaks of infection. Evidence is accumulating that contaminated surfaces make an important contribution to the epidemic and endemic transmission of MDROs e.g. MRSA, VRE and also that for *C difficile*. The APSIC Guidelines for Environmental Cleaning and Decontamination was released in March 2013 to give guidance on environmental hygiene at hospitals. Designing and implementing an environmental hygiene program incorporating the recommendations in the guidelines is best done using the quality improvement approach involving the relevant stakeholders.

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NOVEL TECHNOLOGY FOR ENVIRONMENTAL CLEANING

Trish Perl. *Johns Hopkins University School of Medicine in Baltimore, MD, United States*

With the emergence of multi drug resistant organisms, novel viruses and organisms that have a predilection for the environment; the contribution of the environment to transmission of resistant or significant organisms is now recognized so there are a myriad of products and equipment that attempt to improve cleaning and even disinfect the environment because even in the best of circumstances traditional cleaning is not perfect. In fact, in addition to some of the issues associated with complex surfaces with many nooks and crannies that are difficult to clean, there is also the need for rapid turn over to assure patient access to beds in a high turnover job that is not viewed as prime. Plus, materials with antimicrobial properties are being applied to high touch surfaces or products that may be reused to decrease the risk of cross contamination to assist with this effort.
The focus on products, cleaning techniques and measurement of cleaning has become increasingly important in managing of healthcare facilities. We will discuss the role of product, process and the use of performance improvement strategies to enhance the cleanliness of healthcare facilities. We will also review measurement of the process and what works and what doesn't work. Of particular interest in the current market—one is the use of technology to improve compliance. Compliance with basic practices such as cleaning is commonly poorer than we would like for many reasons including poor knowledge, limited supplies, and inconvenience. Hence, technology that can automate measurement and its use is very intriguing.
However, the healthcare environment is becoming increasingly complex and if one goes into patient rooms they are filled with monitors and complicated equipment. We also work in an environment where we are asked to do more with less. Hence, the infection control community is challenged to rely on standard infection prevention strategies and has introduced different types of technology to facilitate work and improve patient safety. Technological solutions are emerging as part of the landscape and we will discuss some of these technologies and the challenges with some of these.

Examples of different cleaning technologies for healthcare that are currently used, being evaluated or proposed[1]

Disinfectants & Cleaning tools:
- Demand-release chlorine disinfectants :
  - Chlorine dioxide
  - Sodium dichloroisocyanurate
  - Chloramine-t7
- Superoxidized water
- Microfiber mops
- Microfiber wipes

Soft Surface Technologies:
- Copper oxide impregnation
- Citric acid impregnation
- Organosilane-based quaternary ammonium impregnation
- Silver-impregnated yarn

Hard Surface Technologies:
- Copper and copper alloy cladding
- Silver iodide and modified polyhexamethlyene biguanide coating
- Silver nanoparticle incorporation
- Triclosan incorporation
- Quaternary ammonium salt surfactant coating
- Microtopographic surfaces
- Light-activated antimicrobial coatings
  - Cellulose acetate-containing toluidine blue O and rose Bengal
  - Silicon polymer-containing methylene blue and gold nanoparticles
  - Titanium dioxide coating

Whole room technologies:
- UV light
- Combination of ozone/UV light/HEPA filtration
- Hydrogen peroxide vapor or aerosolization
- Titanium dioxide

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BEST PRACTICES FOR STERILIZATION AND HIGH-LEVEL DISINFECTION OF REUSABLE MEDICAL DEVICES

Cheri Ackert-Burr, RN, MSN, CNOR, AGTS. *Clinical Education Manager at Medivators, United States*

Description: This program reviews best practices for sterilization and high level disinfection of reusable medical devices in hospitals and ambulatory surgery centers (ASCs). Special emphasis will be placed on complex devices;

[1] Currie, B. (2013), Revisiting Environmental Hygiene and Hospital-Acquired Infections, IDSE, http://www.idse.net/download/HAI_IDSE13_WM.pdf